Textures

Draw Objects Sorted by Texture

This way the texture cache isn't flushed between objects. See also above, "Render Objects with Same Rendering State".

Texture Cache

Consider the size of the texture cache when defining textures. Cache misses can slow performance down appreciably. The total size needed by textures depends on their number, dimensions, and bit-depth; ideally, this size should be smaller than the cache size.

Use Texture Compression

If a texture compression feature is available, turning it on and using it is likely to improve performance.

Etc2/Eac compressed textures are typically uncompressed during texture lookups by the GPU for free. They save memory and increase the performance of the texture cache by reducing bandwidth. The following Etc2/Eac formats are supported by Candera on OpenGL ES3.0 platforms:

Compressed Bitmap::PixelFormat	Uncompressed generic format	size ratio compressed to uncompressed
Etc2CompressedRgbPixelFormat	RGB	1/6
Etc2CompressedSrgbPixelFormat	sRGB	1/6
Etc2Alpha1CompressedRgbaPixelFormat	RGBA	1/8
Etc2Alpha1CompressedSrgbaPixelFormat	sRGBA	1/8
Etc2EacCompressedRgbaPixelFormat	RGBA	1/4
Etc2EacCompressedSrgbaPixelFormat	sRGBA	1/4

EacCompressedUnsignedRPixelFormat	A	1/2
EacCompressedSignedRPixelFormat	signed A	1/2
EacCompressedUnsignedRGPixelFormat	LA	1/2
EacCompressedSignedRGPixelFormat	signed LA	1/2

Note: 'A' stands for Alpha (uncompressed equivalent format: AlphaUnsignedBytePixelFormat), and 'LA' for Luminance Alpha (uncompressed equivalent format: LuminanceAlphaUnsignedBytePixelFormat).

If texture compression is supported, avoid uncompressed textures as much as possible. E.g. 1 uncompressed RGB texture takes as much space as 6(!) Etc2CompressedRgb textures. Plus uncompressed textures decrease performance.

There a several compressed RGBA formats to choose from, which primarily affect the quality of the Alpha channel. If the alpha channel is only used to indicate fully opaque/transparent regions, then Etc2Alpha1Compressed formats are the best fit. If quality of transparency in Etc2EacCompressed textures is lacking, a combination of a compressed RGB texture together with a compressed single channel Alpha texture (EacCompressedUnsignedR/EacCompressedSignedR) should be favored over an uncompressed texture, because the 2 compressed textures need less memory and bandwidth than an uncompressed one.

Signed compressed textures have the capability to express 0 exactly in every pixel of the compressed texture. This is useful for sharp transparent edges, or for normal maps that are encoded in the EacCompressedUnsignedRG format.

Use Mip Maps

For objects that occupy static screen size, try to fit texture to rendered object size. For objects that change size on screen use Mip-Mapping to avoid texture aliasing effects and to improve runtime performance. Mip-Mapping consumes little more memory (max 1/3 more than the biggest bitmap).

Texture filter MipMapNearest consumes less time than MipMapLinear, which processes a trilinear filtering.

Combine Textures

Associated segments, for example rims and tires, should be combined into one texture. The different segments (nodes) share the same texture, but each of them refers to a different area within the texture. This way, the texture only needs to be activated once for multiple nodes.

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